Marketing Datasheet

ML4039-XX

ML4039
ML4039-02
ML4039-ATE

4-Lane 2-28Gbps/ Lane
Bit Error Rate Tester
Bathtub Curve Measurement
Eye Contour Measurement
ML4039
4 Channel 2-28Gbps BERT
Bit Error Rate Tester

Key Features
- Four independent parallel BERT lanes.
- Data Rate: 2 to 28Gbps, BER less than 1E-17.
- Independent voltage level adjustment for each of the 4 outputs; refer to Generator Data Out table.
- PRBS: 7, 9, 10, 11, 15, 20, 23, 31.
  User Pattern: 80 bits.
  High fidelity signal capture, low intrinsic Jitter.
- Support for external API calls from other software e.g. LabView.
- Repeatable performance and Traceable to standards.
- High port density configuration and Low power consumption.
- Pre-Emphasis, Phase Margin capabilities.
- Compact form factor for integration into load board for most ATE systems

BER & Measurements Suite
- Eye contour.
- Bathtub.
- Continuous.
- Pre-Emphasis control.

Low Power Dissipation
- ML4039 / ML4039-ATE: 16W.
- ML4039-02: 40 W.

Four channel 28G BERT for Wafer Sort and Production testing of 28G semiconductor components and Active Optical Cables

Summary
The ML4039 is a state of the art low cost 4 Lane 28Gbps BERT module that is fully featured for production testing of 28G components used in the AOCs, 100G electro-optical modules and systems. The instrument is offered in 3 different flavors (with or without Pre-Emphasis and for ATE): ML4039/ML4039-02/ML4039-ATE.

Target Applications
- At-speed ATE testing
- Ultra High Speed Backplane Test Solution, emphasis and skew tolerance test.
- Multi-Lane BERT testing, ideal for high port count volume production testing.
- 100GbE Device Test Solution - High quality and functional test signals.
- Electro-optical Transceiver Testing.
- Production Test Solution for Multiple Optical Modules and High-Speed Connectors - Low Cost and Low Power Consumption: Active Optical Cable (AOC), Direct Attach Cable (DAC), SFP+, zQSFP, QSFP+, CFP-2 / CFP4, CXP, Sx7 long haul interconnect and EDR test applications.
- 100G EDR QSFP line cards.
- Design/Validation Test (DVT) of Telecom & Datacom Components and Systems.
- 32/16/8/4/2G Fiber Channel applications.

Available Application Software
- Scripted Testing – Automated test scripts allow for continuous testing
- Fast BER measurements for ATE production testing
- Automated measurement libraries for bathtub curve, J2/J9 measurements
- Dynamic link libraries and documented APIs for use by host control
**CFP2 4x25G Host ML4027**

Yearly calibration required.

### Electrical Specifications

<table>
<thead>
<tr>
<th>Generator Data Out</th>
<th>ML4039 / ML4039-ATE</th>
<th>ML4039-02 (Advanced I/O)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bit Rates</strong></td>
<td>2 – 28 Gbps</td>
<td>1.6-28 Gbps</td>
</tr>
<tr>
<td><strong>Number of Lanes</strong></td>
<td>4 Lanes</td>
<td>4 Lanes</td>
</tr>
<tr>
<td><strong>Patterns</strong></td>
<td>PRBS 7, 9, 10, 15, 20, 23, 31, User Pattern 80 bits</td>
<td></td>
</tr>
<tr>
<td><strong>TX Amplitude Adjustment</strong></td>
<td>600 to 1200 mVp-p diff. 1 mV step</td>
<td>700 to 1300 mVp-p diff. 1mV step</td>
</tr>
<tr>
<td><strong>Pre-Emphasis</strong></td>
<td>6db</td>
<td>4 UI taps 6dB</td>
</tr>
<tr>
<td><strong>Rise/ Fall Time (20–80%)</strong></td>
<td>12 ps Typical</td>
<td></td>
</tr>
<tr>
<td><strong>Random Jitter rms</strong></td>
<td>0.4 ps</td>
<td>0.3 ps</td>
</tr>
<tr>
<td><strong>Deterministic Jitter</strong></td>
<td>4ps</td>
<td>2ps</td>
</tr>
<tr>
<td><strong>Output Interface</strong></td>
<td>K Connectors</td>
<td>K Connectors</td>
</tr>
<tr>
<td><strong>Output Diff.</strong></td>
<td>100mV to 1200mV</td>
<td>100mV-2600mV</td>
</tr>
<tr>
<td><strong>Common Mode control</strong></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Multi-CH Operation</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Duty Cycle Control / Cross Point Adj.</strong></td>
<td>No</td>
<td>20-80%</td>
</tr>
<tr>
<td><strong>Lane-Lane Skew control</strong></td>
<td>No</td>
<td>100pS, resolution 0.1pS</td>
</tr>
</tbody>
</table>

### Reference Clock

| **Clock Output AC coupled** | Rate / N | 16GHz (half rate) |
| **Interface**               | K / SMPM  | K Connectors      |
| **Amplitude**               | 400mV    | 400mV             |
| **Clock Input**             | Rate/40  | 16GHz (half rate) |
| **Clock Input**             | No       | K Connectors      |
| **Synthesizer required**    | No       | Yes               |
| **Amplitude**               | 0.3-1.0Vp-p | 0.3-1.0Vp-p   |

### Error Detector

| **Data Rates** | 2 to 28Gbps |
| **Data Input Amplitude** | 60-600mV SE | 50-800mV SE |
| **Patterns** | PRBS 7, 9, 10, 11, 15, 20, 23, 31. |
| **Vertical Scan Resolution** | 8 bits | 12 bits |
| **Phase Scan Resolution** | 1/64 UI | 10bits |
| **Phase Margin** | 10ps | 8ps |
| **Data Input Interface** | K connectors on ML4039 & ML4039-02, SMPM on ML4039-ATE |
| **Clock Input** | SMA (Optional) |
**Functional Block Diagrams**

![Functional Block Diagrams](Image)

**Ordering Information**

<table>
<thead>
<tr>
<th>Order No</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML4039</td>
<td>4 Channels 2-28Gbps BERT with Pre-Emphasis, one clock output.</td>
</tr>
<tr>
<td>ML4039-ATE</td>
<td>4 Channels 28Gbps BERT with Pre-Emphasis, one clock output and Synthesizer input.</td>
</tr>
<tr>
<td>ML4039-ATE</td>
<td>4 Channels 28Gbps BERT with Pre-Emphasis, one clock output for ATE load board applications</td>
</tr>
<tr>
<td>ML4039-3W, ML4039-02-3W, ML4039-ATE-3W</td>
<td>3 years warranty.</td>
</tr>
<tr>
<td>ML4039-5W, ML4039-02-5W, ML4039-ATE-5W</td>
<td>5 years warranty.</td>
</tr>
<tr>
<td>ML4000</td>
<td>MultiLane Signal Integrity Analyzer (MSIA) Chassis. 6U cPCI, PSB.</td>
</tr>
<tr>
<td></td>
<td>1 year warranty</td>
</tr>
</tbody>
</table>

**MultiLane SAL**

MultiLane SAL is leading developer of high speed instruments and interconnects test modules for 10, 40, and 100Gbps of SerDes and high speed IO for the semiconductor and cloud computing infrastructure. Products includes BERTs, Scopes, and a host of MSA Compliant development tools for CFP, CFP2, QSFP, zQSFP, and 5x7 LH modules. MultiLane’s products are used to test semiconductors, AOC, electro-optical modules and blades. MultiLane operates out of Houmal Technology Park in Lebanon, and has been offering leading edge technology and products to Tier-1 equipment suppliers globally. Visit [www.multilaneinc.com](http://www.multilaneinc.com)

**Datasheet History**

Rev 0.1: February 5th, 2013; first publication.

**Worldwide**

**MultiLane SAL**

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